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**Response to the Comment “Phantom of the Opera?” or “Sex and the City” by  
Thomas K. Bauer, Philipp Breidenbach, and Christoph M. Schmidt**

Oliver Falck, Michael Fritsch, Stephan Heblich

In our paper “The Phantom of the Opera,” published in this journal in 2011, we use proximity to a baroque opera house location to predict concentrations of high-skilled individuals today. We further show that these individuals exert local human capital spill-overs that contribute to regional growth. We argue that the existence of a baroque opera house (built between 1648 and 1800) was orthogonal to economic development at that time because local rulers disregarded economic scarcities in their competition for prestige. Coincidentally, baroque opera houses have started off a long-lasting local cultural scene. Even today, baroque opera house locations host significantly higher shares of artists and public cultural spending than comparable locations where the opera house was built more recently (see Table 1).<sup>1</sup> By contrast, public spending on other leisure time activities is comparable across these locations.

Thomas K. Bauer, Philipp Breidenbach, and Christoph M. Schmidt (BBS) challenge our argument using two strategies. First, they regress a county’s share of high-skilled individuals today on the proximity to other historical consumptive amenities that should arguably not affect today’s spatial distribution of high-skilled individuals. Finding a significant effect for proximity to major historical breweries (built before 1700) and brothels (built before 1600), the authors conclude that these effects as well as our opera-house effect are likely driven by unobserved location factors.

The locations of major early breweries and brothels are, however, far from random. Beer was already a key export in the Hanseatic era.<sup>2</sup> It is thus hardly surprising that important early breweries tended to cluster in and around Hanseatic cities. Monasteries that often acted as early agents of local development were another important beer producer. Early institutionalized brothels were set up as regulatory measures in growing cities that saw a significant increase in the number of prostitutes (see Schuster, 1992). Such cities were often located along trading routes. Both cases imply that breweries and brothels were typically located in proximity to historic centers of development. Since locations with early high income levels tend to remain high-income locations (Nunn 2009), significant distance-to-brewery and distance-to-brothel effects in

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<sup>1</sup> See Falck, Fritsch, Heblich, and Otto (2015) for a more detailed explanation.

<sup>2</sup> For a short history of beer, see Lohberg (2009).

contemporaneous data are simply to be expected. Therefore, it is misleading to interpret it as evidence for *unobserved* location factors.

BBS' second strategy is a 'horse race' between distance to the closest baroque opera house, distance to the closest historical ruling city of the German Federation in 1817 and distance to the closest big city (out of 20) in the German territory in 1650. Since some of these big or ruling cities also host a baroque opera house, the distance-to-opera house coefficient smaller but still proves to be significant at the one-percent level (BBS, Column 1, Table 2 and Column 1, Table 4). This underlines our argument that we do not compare administratively important or big cities with remote towns. Instead, we often compare remote towns having a baroque opera house to remote towns lacking a baroque opera house.<sup>1</sup> This is the relevant comparison.

Once BBS compare counties within West Germany and within East Germany, distance to the closest opera houses loses its significance (BBS, Column 2, Table 4). While this may be a small-sample problem (there are a total of 413 counties, 86 of them in East Germany), the authors make a valid point that it may not be appropriate to compare West German counties to East German ones.

In a follow-up study (Falck, Fritsch, Heblich, and Otto, 2015), we address the small-sample issue and exploit data for the universe of workers subject to social security in West Germany over the period 1975-2010. In our first stage, we regress the share of high-skilled workers in a West German county in a given year on the distance to the closest baroque opera house, interacted with year dummies. We find that being one kilometer closer to a baroque opera house translates into a 0.3 percentage-point higher share of high-skilled workers in a county in 2010 relative to 1975 (downward-sloping line in Figure 1). This corroborates Moretti's (2012) argument that consumptive amenities became increasingly important for the location decision of high-skilled individuals.

In a counterfactual analysis, we employ propensity score matching techniques to determine historic twins for all West German baroque opera house locations. These twins are solely determined by historical location characteristics, including key

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<sup>1</sup> The example of two Franconian margraviates, Ansbach and Bayreuth illustrate our argument. It is well documented that extravagance and patronage in the baroque era ruined both margraviates (Haus der Bayerischen Geschichte, 1990, Chapter 5), but only the margravate of Bayreuth chose to build an opera house – and it has the higher human capital share of the two today.

determinants for brewery and brothel locations.<sup>1</sup> Regressing the share of high-skilled individuals in a county on the distance to the closest counterfactual baroque opera house location, we find a flat line for the distance coefficient (cf. Figure 1). This placebo strategy differs from the one presented by BBS in one important aspect: we determine a group of counterfactual locations that resemble large *and* small cities while BBS's counterfactual group only consists of ruling cities in the German Federation. This is a clear bias towards big cities and the path dependencies described above.

Given this unambiguous confirmation of our previous findings, we are convinced that the instrumental variable strategy introduced in “The Phantom of the Opera” remains valid. However, we agree with BBS that our results by no means suggest spending on cultural amenities as a panacea for structurally weak regions. What we do is to show that there are social returns to public money spent on cultural amenities.

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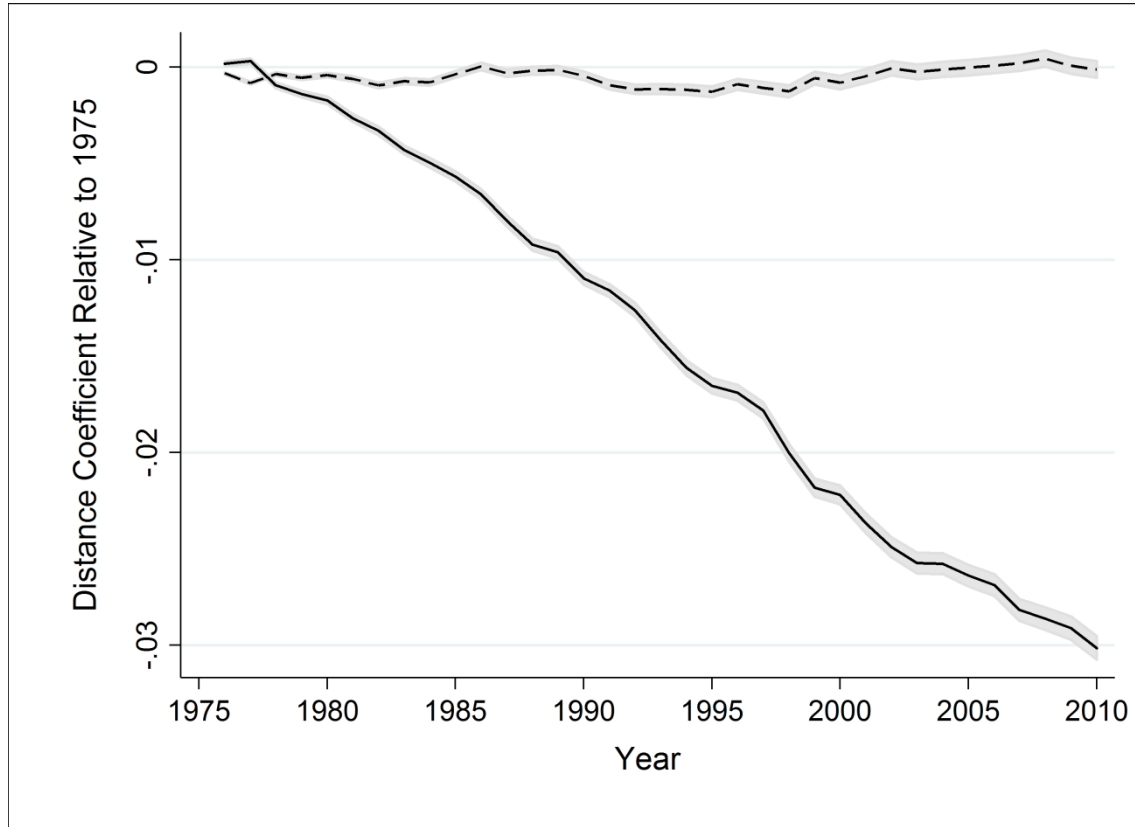
<sup>1</sup> The location characteristics comprise the availability of mineral deposits, agricultural productivity, state size, degree of urbanization, access to the coast or large rivers, existence of a historic university, free, Hanseatic or imperial city status, religious denomination, and number of monasteries per capita observed in 1500. We are grateful to Davide Cantoni who provided us with the geocoded data on historical monasteries from Jürgensmeier and Schwerdtfeger (2005-2008). As in Cantoni (2015), we consider the number of monasteries within 5km of a county centroid and relate it to the city population in 1500.

Table 1: Comparison between baroque opera house locations and other opera house location

	Baroque Opera House Location	Other Opera House Location	Difference (1-2) [p-value]
<i>Panel A: Artists per 1000 inhabitants 2002-2007</i>			
Freelance artists, writing	2.639 (0.481)	1.660 (0.226)	0.979 [0.019]
Freelance artists, acting	1.181 (0.178)	0.748 (0.088)	0.433 [0.008]
Freelance artists, music	2.802 (0.288)	1.826 (0.165)	0.976 [0.001]
Freelance artists, graphic arts	3.846 (0.484)	2.457 (0.275)	1.389 [0.005]
Freelance artists, all	10.468 (1.334)	6.691 (0.699)	3.777 [0.004]
Employed artists subject to social insurance	6.697 (0.586)	5.074 (0.438)	1.623 [0.018]
<i>Panel B: Public Spending in Euro per inhabitant, 2004</i>			
Theater, Concerts and cultivation of	100.19 (12.05)	69.47 (6.50)	30.72 [0.008]
Music			
Sports facilities, swimming pools, and	46.12 (3.57)	48.48 (2.97)	-2.36 [0.681]
other recreational facilities			
Popular education	19.47 (2.50)	21.04 (1.55)	-1.57 [0.708]
Number of observations	29	63	-

*Notes:* The table shows means and standard errors for different measures of local artists per 1,000 inhabitants (Panel A) and public spending in Euro on amenities (Panel B) in 29 baroque opera house locations (Column 1) and 63 locations where the opera house was built after the baroque era (Column 2). Column 3 shows the difference (*diff*) between Column 1 and Column 2 along with the p-value of  $H_0$ :  $\text{diff} < 0$ . The share of artists in 1907 is measured per 1,000 workers. Source: Falck, Fritsch, Heblich, and Otto (2015).

Figure 1: Relationship between a county's share of high-skilled workers and distance to the actual and counterfactual opera house locations, West Germany, 1976-2010



*Notes:* The figure is a graphic representation of the time-variant distance coefficients from a regression on a county's share of high-skilled workers with 1975 as base year. The solid line represents distance coefficients for the actual distance to the closest baroque opera house and the dashed line represents the regressions results using the counterfactual distances. The coefficients are enclosed by a 95-percent confidence band. Each coefficient shows the expected relative percentage point increase in the share of high-skilled workers when moving 1 km closer to a baroque opera house location. Sources: Following Falck, Fritsch, Heblich, and Otto(2015); Cantoni (2015) for the number of monastries p.c..